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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/091,106	03/05/2002	John Commander	CEDE 2036	5919

321 7590 01/03/2006

SENNIGER POWERS
ONE METROPOLITAN SQUARE
16TH FLOOR
ST LOUIS, MO 63102

EXAMINER	
WONG, EDNA	

ART UNIT	PAPER NUMBER
1753	

DATE MAILED: 01/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/091,106	COMMANDER ET AL.	
	Examiner	Art Unit	
	Edna Wong	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,17 and 65-69* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,17 and 65-69* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

This is in response to the Amendment dated November 9, 2005. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Response to Arguments

Claim Rejections - 35 USC § 112

Claims **1-7 and 31** have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The rejection of claims 1-7 and 31 under 35 U.S.C. 112, second paragraph, has been withdrawn in view of Applicants' amendment.

Claim Rejections - 35 USC § 102

I. Claim **31** has been rejected under 35 U.S.C. 102(b) as being anticipated by **Creutz, deceased et al.** (US Patent No. 4,110,176).

The rejection of claim 31 under 35 U.S.C. 102(b) as being anticipated by Creutz, deceased et al. has been withdrawn in view of Applicants' amendment. Claim 31 has been cancelled.

II. Claim **43** has been rejected under 35 U.S.C. 102(b) as being anticipated by **Creutz, deceased et al.** (US Patent No. 4,110,176).

The rejection of claim 43 under 35 U.S.C. 102(b) as being anticipated by Creutz, deceased et al. has been withdrawn in view of Applicants' amendment. Claim 43 has been cancelled.

Claim Rejections - 35 USC § 103

I. Claims **1-7** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Barstad et al.** (US Patent No. 6,444,110 B2) in combination with **Creutz, deceased et al.** (US Patent No. 4,110,176).

The rejection of claims 1-7 under 35 U.S.C. 103(a) as being unpatentable over Barstad et al. in combination with Creutz, deceased et al. is as applied in the Office Action dated August 10, 2005 and incorporated herein. The rejection has been maintained for the following reasons.

II. Claim **17** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **Barstad et al.** (US Patent No. 6,444,110 B2) in combination with **Creutz, deceased et al.** (US Patent No. 4,110,176).

The rejection of claim 17 under 35 U.S.C. 103(a) as being unpatentable over Barstad et al. in combination with Creutz, deceased et al. is as applied in the Office Action dated August 10, 2005 and incorporated herein. The rejection has been maintained for the following reasons.

Applicants state that Creutz et al. cannot fairly be deemed to be analogous art to claims 1-7 and 17 because the problems encountered by Creutz et al. are not reasonably pertinent to those encountered by the Applicants.

In response, the reason or motivation to modify the reference may often suggest what the inventor has done, but for a different purpose or to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by the Applicants. *In re Linter* 458 F.2d 1013, 173 USPQ 560 (CCPA 1972); *In re Dillon* 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990), *cert. denied*, 500 US 904 (1991); and MPEP § 2144.

Barstad et al. teach that copper plating has been employed on *circuit board manufacturing* to plate outer layers where final circuitry is defined. More recently, copper plating has been employed in *semiconductor chip manufacture* to provide chip interconnections (col. 1, lines 36-65; and col. 7, lines 56-65). Conventional copper plating systems can be suitable for plating vias and trenches as small as 300 nm with 4:1 aspect ratios (col. 2, lines 20-25). Barstad et al. shows the copper electroplating of through hole walls of a printed circuit board substrate (col. 8, Example 1) and microvias of a semiconductor microchip wafer (col. 8, Example 2) using similar copper electroplating baths.

These teachings would have suggested to one having ordinary skill in the art that the *copper plating systems* used in circuit board manufacturing would have been used in semiconductor chip manufacturing.

Thus, Creutz et al. can fairly be deemed to be analogous art to claims 1-7 and 17 because Creutz et al. teaches similar copper electroplating bath chemistries (cols. 5-6, Example 1) as disclosed in Barstad et al. (col. 8, Examples 1-2), where Barstad et al. teach that such copper plating systems are suitable for circuit board manufacturing and semiconductor chip manufacturing.

Thus, using the N-(2-ydroxyethyl)polyethylenimine disclosed by Creutz et al. (col. 3, line 67 to col. 4, line 17) as the brightening agent in the copper electroplating baths disclosed by Barstad et al. (col. 8, Examples 1-2) would have been suitable for the electroplating of copper in the through hole walls of a printed circuit board substrate and the microvias of a semiconductor microchip wafer.

Barstad et al. teaches enhanced bottom-fill plating of small diameter and/or high aspect ratio microvias (col. 6, lines 5-22). Using the N-(2-ydroxyethyl)polyethylenimine disclosed by Creutz et al. as the brightening agent in the copper electroplating baths disclosed by Barstad et al. (col. 8, Examples 1-2) would have bottom-fill plated (or superfilled) small diameter and/or high aspect ratio microvias (col. 6, lines 5-22) because such as substitution would not have affected the operation of the copper electroplating baths disclosed by Barstad et al.

Applicants state that Barstad et al. teach that their compositions and additives are useful for plating both types of substrates; but they do not suggest anything about the applicability of any other additives, such as Creutz et al.'s additives.

In response, there is no requirement that the motivation to make the combination be expressly articulated in one or more of the references. The teaching, suggestion or inference can be found not only in the references but also from knowledge generally available to one of ordinary skill in the art. *Ashland Oil v. Delta Resins* 227 USPQ 657 (CAFC 1985). The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. *In re McLaughlin* 170 USPQ 209 (CCPA 19710; *In re Rosselet* 146 USPQ 183 (CCPA 1960). References are evaluated by what they collectively suggest to one versed in the art, rather than by their specific disclosures. *In re Simon* 174 USPQ 114 (CCPA 1972); *In re Richman* 165 USPQ 509, 514 (CCPA 1970).

Applicants state that Barstad et al. cannot fairly stand for the broad notion that any copper plating composition that is useful to plate a circuit board substrate will also be useful for plating today's integrated circuit devices, i.e., devices with submicron-sized features, and for solving superfilling problems.

In response, Barstad et al. shows the copper electroplating of through hole walls of a printed circuit board substrate (col. 8, Example 1) and microvias of a semiconductor microchip wafer (col. 8, Example 2) using similar copper electroplating baths. These teachings would have suggested to one having ordinary skill in the art that copper plating composition that is useful to plate a circuit board substrate would have been also be useful for plating today's integrated circuit devices.

Applicants state that Barstad et al. make no suggestion, express or implied, that plating chemistries formulated for plating PCBS (whether today or 30 years ago) can be applied successfully to modern semiconductor integrated circuit device substrates. In response, there is no requirement that the motivation to make the combination be expressly articulated in one or more of the references. The teaching, suggestion or inference can be found not only in the references but also from knowledge generally available to one of ordinary skill in the art. *Ashland Oil v. Delta Resins* 227 USPQ 657 (CAFC 1985). The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. *In re McLaughlin* 170 USPQ 209 (CCPA 19710; *In re Rosselet* 146 USPQ 183 (CCPA 1960). References are evaluated by what they collectively suggest to one versed in the art, rather than by their specific disclosures. *In re Simon* 174 USPQ 114 (CCPA 1972); *In re Richman* 165 USPQ 509, 514 (CCPA 1970).

Response to Amendment

Claim Objections

Claim **65** is objected to because of the following informalities:

Claim 65

line 2, the word "comprises" should be amended to the word -- includes --. See claim 1, line 7.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

Claims **65-69** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Barstad et al.** (US Patent No. 6,444,110 B2) in combination with **Creutz, deceased et al.** (US Patent No. 4,110,176) as applied to claims 1-7 above.

Barstad et al. and Creutz, deceased et al. are as applied in the Office Action dated August 10, 2005 and incorporated herein.

Barstad also teaches wherein the electroplating bath further comprises sulfuric acid present in an amount between about 150 g/L and about 225 g/L (= 175 g/l H_2SO_4) [col. 8, Example 2].

A source of the ionic copper is copper sulfate pentahydrate present in an amount between about 59 g/L and about 75 g/L (= 70 g/l $CuSO_4 \cdot 5\ H_2O$) [col. 8, Example 2].

The method of Barstad differs from the instant invention because Barstad does not disclose the following:

a. Wherein the electroplating bath comprises 1.0 mL/L of said defect reducing agent, as recited in claim 67.

b. Wherein the electroplating bath comprises 2.0 mL/L of said defect reducing agent, as recited in claim 68.

c. Wherein the electroplating bath comprises 5.0 mL/L of said defect

reducing agent, as recited in claim 69.

Barstad teaches a brightener concentration of at least 1.75 mg/l (col. 4, lines 49-61).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the concentration of the brightener described by Barstad with wherein the electroplating bath comprises 1.0 mL/L of said defect reducing agent; wherein the electroplating bath comprises 2.0 mL/L of said defect reducing agent; and wherein the electroplating bath comprises 5.0 mL/L of said defect reducing agent because elevated brightener concentrations would have resulted in "bottom-fill" copper plating of a microvia or other aperture without defects such as inclusions or voids (col. 3, lines 20-30) and uniform plating of a particular high aspect ratio microvias and other difficult-to-plate apertures would have been possible (col. 4, lines 44-48) as taught by Barstad.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

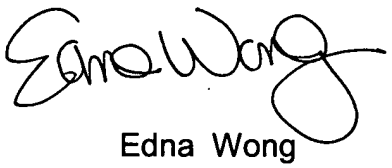
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Edna Wong
Primary Examiner
Art Unit 1753

EW
December 29, 2005